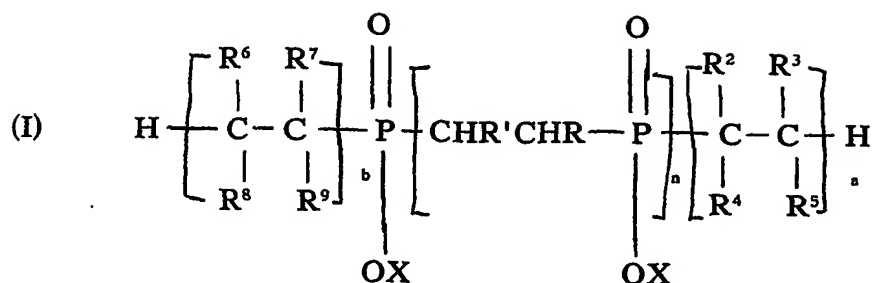


CLAIMS

1. A polymer of formula (I)



wherein:

R and R' are each independently selected from hydrogen, a hydroxyl group, a carboxyl group, an alkyl, aryl or alkaryl group or a hydroxy - or carboxy substituted - alkyl, aryl or alkaryl group provided that R and R' together have a total of less than 23 carbon atoms and n is greater than 1; X is hydrogen or a cation or an alkyl group;

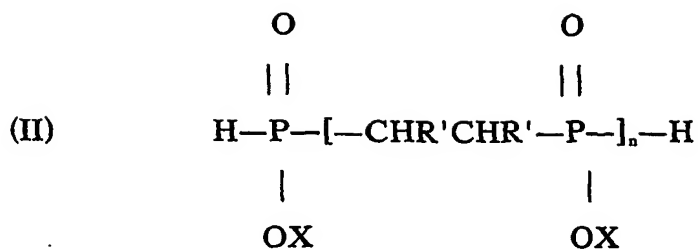
one of R², R³, R⁴, R⁵ is a phosphonate or a sulphonate group and the remainder of R², R³, R⁴, R⁵ are each independently selected from hydrogen, alkyl, aryl, alkaryl, alkoxy, hydroxy, hydroxy or carboxy substituted alkyl, phosphonate or sulphonate groups and a is from 1 to 5;

R⁶, R⁷, R⁸, R⁹ are each independently selected from hydrogen, alkyl, aryl, alkaryl, hydroxy, alkoxy, hydroxy or carboxy substituted alkyl or carboxy groups and b is from 5 to 200.

2. A method of making the polymer of Claim 1, the method comprising reacting;

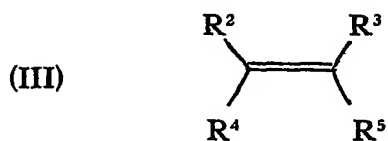
- 1) a compound of Formula (II):

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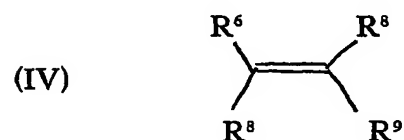


wherein R, R', n and X each have the same significance as in Formula (I);

with 2) a monomer of Formula (III)



in the presence of an initiator; and subsequently reacting the reaction product of 1) and 2) with a further monomer of Formula (IV):



wherein R², R³, R⁴, R⁵, R⁶, R⁷, R⁸ and R⁹ each have the same significance as in Formula (I).

3. A method as claimed in Claim 2 in which the monomer (III) is selected from the group consisting of vinyl phosphonic acid (VPA), vinylidene-1, 1-diphosphonic acid (VDPA) and vinyl sulphonic acid (VSA).

4. A method as claimed in Claim 2 or Claim 3 in which the initiator is sodium persulphate ($\text{Na}_2\text{S}_2\text{O}_8$).
5. A method as claimed in Claim 2 or Claim 3 in which the initiator is hydrogen peroxide, an azo compound, an organic peroxide or a source of ultraviolet or ionising radiation.
6. A method as claimed in any one of Claims 2 to 5 in which the monomer (IV) is an unsaturated carboxylic acid.
7. A method as claimed in Claim 6 in which the monomer (IV) is acrylic acid.
8. A method as claimed in Claim 6 in which the monomer (IV) is an unsaturated carboxylic acid selected from the group consisting of methacrylic acid, fumaric acid, maleic acid, itaconic acid, aconitic acid, mesaconic acid, citraconic acid, crotonic acid, isocrotonic acid, angelic acid, tiglic acid and their water soluble salts.
9. A method as claimed in any one of Claims 2 to 8 in which the reaction is carried out at a temperature of between 60°C to 110°C .
10. A method as claimed in Claim 9 in which the reaction is carried out at a temperature of 95°C .
11. The use of the polymer of Claim 1 for the inhibition of scale in an aqueous system.
12. Use according to Claim 11, in which the aqueous system is or comprises a boiler, a cooling system, a desalination plant, a geothermal water or an oilfield brine.

13. The use of the polymer of Claim 1 in an aqueous based functional fluid selected from the group consisting of hydraulic fluids, lubricants, cutting fluids and oilfield drilling muds.

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14. The use of the polymer of Claim 1 in the squeeze treatment of oil wells.

15. The use of the polymer of Claim 1 in inhibiting the formation of barium sulphate scale and/or calcium sulphate scale in oilfields.

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16. The use of the polymer as claimed in Claim 1 in conjunction with one or more other water treatment agents selected from the group consisting of surfactants; sequestrants; chelating agents; corrosion inhibitors; oxidising biocides; bleaches; foam controlling agents; buffers and dispersants.

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17. A corrosion-inhibiting pigment comprising a solid which has been prepared by reacting a concentrated aqueous solution of a water-soluble polymer according to Claim 1 with a base or salt of calcium, zinc, barium, aluminium or other polyvalent metal and precipitating a solid salt.

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18. A corrosion-inhibiting formulation comprising a pigment as claimed in Claim 17 which is dissolved or dispersed in an anti-corrosive paint, varnish, enamel, lacquer, or other coating formulation.

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19. A corrosion-inhibiting formulation as claimed in Claim 18 in which the formulation further comprises a liquid vehicle.

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20. A corrosion-inhibiting formulation as claimed in Claim 19 in which the liquid vehicle is water.
21. A corrosion-inhibiting formulation as claimed in Claim 18 in which the formulation further comprises a volatile organic solvent selected from petroleum spirit, turpentine, ketones and esters and/or an aromatic hydrocarbon solvent, and/or a drying oil selected from linseed oil, soya oil, tung oil, and dehydrogenated castor oil.
22. A corrosion-inhibiting formulation as claimed in any one of Claims 18 to 21 in which the formulation further comprises a resin selected from polyester, urea, polyurethane, vinyl chloride, vinyl acetate, phenolic and epoxy resins and/or a dispersed pigment.
23. A corrosion-inhibiting coating composition containing a pigment according to Claim 17.
24. The use of a corrosion-inhibiting formulation as claimed in any one of Claims 18 to 22 in the treatment of metal surfaces after machining and prior to storage, coating, electroplating polishing or etching.
25. The use of a polymer of Formula (I) in the inhibition of scale formation, substantially as hereinbefore described with reference to the Examples.